

# JUNYOUNG KIM

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## EDUCATION

### Hanyang University

Master of Science, Department of Interdisciplinary Robot Engineering Systems

Mar. 2020 – Aug. 2022

Ansan, Republic of Korea

- Advisor: Prof. JeaKweon Han
- Dissertaion: “A study on the Position Estimation of the 1.3m tall Bipedal Humanoid Robot in a Noisy Environment through Keypoint-based Localization”

### Hanyang University

Bachelor of Science, Department of Robotics

Mar. 2014 – Feb. 2020

Ansan, Republic of Korea

## RESEARCH INTERESTS

Research interests both in theoretical analysis and verification using real robotic systems, particularly in **Dynamic Legged Locomotion**, **Whole-Body Control**, **Optimization-based Motion Planning**, and **Reinforcement Learning**.

## RESEARCH EXPERIENCE

### Research Intern | Humanoid Robotics Laboratory

Korea Institute of Science and Technology (Advisor: Dr. YongHwan Oh)

Mar. 2023 – Present

Seoul, Republic of Korea

- **Development of a Wheel-legged Humanoid Robot** [[slide](#)]
  - \* Research focuses on developing optimization-based dynamic locomotion methods, aiming to actively find the next foot placement and optimal step timing for a point-foot biped robot.
  - \* Conducted research on MuJoCo simulations and integrated the developed method into a physical wheel-legged humanoid robot to enhance its mobility.

### Visiting Graduate Researcher | Robotics & Mechanisms Laboratory (RoMeLa)

University of California, Los Angeles (Advisor: Prof. Dennig Hong)

Jan. 2022 – Jul. 2022

CA, United States

- **Development of a Humanoid Robot Localization in Soccer Field** [[slide](#), [demo](#)]
  - \* Developed a vision-based localization system for the humanoid robot platform. Integrated a particle filter with a CNN-based object-detection model to achieve precise localization on the RoboCup soccer field.
  - \* Verified the proposed algorithm via a Webots simulator and successfully implemented the localization system on the physical humanoid robot, deriving high-precision positioning results.
- **Development of a Cooking Dual Manipulator, “YORI”**
  - \* Employed a kinematic controller for multijoint robots to achieve motion generation in MuJoCo.

### Graduate Researcher | HERoEHS Laboratory

Hanyang University (Advisor: Prof. JeaKweon Han)

Mar. 2020 – Jan. 2022

Ansan, Republic of Korea

- **Development of a Humanoid Robot, “ALICE ver.3”**
  - \* Developed a kinematic controller for the upper-body module to generate humanoid body motion.
  - \* Designed and implemented a sophisticated GUI for the humanoid robot platform, enhancing intuitive interaction and dynamic observational capabilities.
- **Development of a Balloon-drone Platform for Air Kinetic Art** [[slide](#), [demo](#)]
  - \* Conceptualized and integrated an ultra-wideband sensor into a wireless positioning system of a robot.
  - \* Applied the Madgwick AHRS algorithm with IMU sensors to align global axes across 50 balloon-drone platforms, enabling effective swarm control.
- **Development of Hotel Guidance Humanoid Robots** [[article](#)]
  - \* Developed an obstacle detection algorithm utilizing individual 2D LiDAR for each stationary humanoid robot, effectively sensing the customer and enabling its function as a receptionist in an unmanned hotel.

- **Development of a Cooperative Robot Concept Mobile Platform to Interact in a Congested Environment**
  - \* Directed operations as the project leader and seamlessly managed software and hardware teams, resulting in the successful creation of a robot owing to an efficient workflow and maximized output.
  - \* Created a mecanum mobile robot with a whole-body concept responsive to external disturbances.
  - \* Structurally positioned multiple load cells and implemented filtering to ensure reactive motion in response to disturbance forces.
- **Development of a Service Mobile Robot with Two 6-DOF Dual Arm Manipulators, “ABLE”**
  - \* Implemented the Cartographer algorithm for 2D SLAM, enabling autonomous operation.
  - \* Integrated the Speech-to-Text functionality using GoogleCloud API, enabling human-robot interaction.

## Undergraduate Researcher

Hanyang University

May 2017 – Feb. 2020

Ansan, Republic of Korea

- **Capstone Design**
  - \* Established a smart factory management system based on image processing with the consideration of a multiprocess environment. Enabled dual mobile robots to work cooperatively on a single task, such as moving objects from one location to another.
- **Development of Handrail Walking Assists for the Elderly (Advisor: Prof. MinSung Kang)** [[article](#)]
  - \* Participated in manufacturing a handrail walking assist, which was showcased at COEX.

## CONFERENCE PUBLICATIONS

- [c4] **J. Y. Kim**, M. S. Ahn, J. K. Han. “Enhancing AdultSize Humanoid Localization Accuracy: A Vision-based aMCL Leveraging Object Detection Model and Hungarian Algorithm,” *2023 22nd IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2023 [[preprint](#)]
- [c3] H. J. Kim, D. K. Oh, **J. Y. Kim**, M. S. Kang. “Development of a Sensor Module for Proximity Communication and Obstacle Detection of Handrail Mounted Type Walking Assists,” *Korean Society for Precision Engineering*, 2018 [[dbpia](#)]
- [c2] H. J. Kim, H. J. Kim, D. K. Oh, **J. Y. Kim**, H. J. Byun, M. S. Kang. “Learning to Generate Trajectory of Striking Motion for Two-link Robot Arm in Air Hockey,” *Korean Society for Precision Engineering*, 2017 [[poster](#)]
- [c1] H. J. Byun, H. J. Kim, H. J. Kim, **J. Y. Kim**, M. S. Kang. “Suggestion of Feedback Mechanism of a Walking Assistant with Handrail for the Elderly,” *Korean Society for Precision Engineering*, 2017 [[dbpia](#)]

## AWARDS

RoboCup 2022 Bangkok Humanoid League AdultSize Soccer Competition, **2nd Place**

Jul. 2022

RoboCup Korea Open 2020 Humanoid AdultSize Soccer, **1st Place**

Aug. 2020

## TEACHING EXPERIENCE

**Teaching Assistant** | Innovation Center for Engineering Education

Mar. 2020 - Dec. 2021

- Graded and evaluated the Learning Assessment Exam, determining the eligibility for engineering certification.
- Collected lecture portfolios for courses offered in the respective semesters and compiled Continuous Quality Improvement (CQI) reports.

## VOLUNTEER EXPERIENCE

**Student Mentor** | Field experiential learning 2019 at the Gangwon Career Education Institute **Jun. 2019 - Aug. 2019**

- Mentored and guided 20 high-school students, fostering an understanding of robotics, and coordinated international field trips to prominent robotics laboratories in Korea and the United States of America.

**Education Mentor** | Hanyang ERICA Summer School 2019 (HESS2019)

Jul. 2019

- Educated students on how to use Arduino and design motor controllers. Students successfully applied this knowledge to develop simple robots, including servo-based manipulators and mobile robots.

## EXTRACURRICULAR ACTIVITIES

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Autonomous Driving Class by Hyundai Motor Company, **H-Mobility**  
Former leader of an athletic club, **Clutch**  
Member of Robotics club, **HY-MEC**

**Jan. 2022 - May. 2022**  
**Mar. 2017 - Feb. 2020**  
**Mar. 2014 - Feb. 2020**

## CERTIFICATIONS

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Certificate of Participation in RoboCup 2022 Bangkok  
H-Mobility Autonomous Driving Class, Hyundai Motor Company  
Certificate of Participation in RoboCup 2021 Worldwide  
Accreditation Board for Engineering Education of Korea (ABEEK) Completion

**Jul. 2022**  
**Jun. 2022**  
**Jul. 2021**  
**Feb. 2020**

## RELEVANT SKILLS

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**Programming Languages:** C/C++, Python, MATLAB  
**Simulation Tools:** MuJoCo, Gazebo, Webots, CoppeliaSim  
**Computer aided design/engineering:** SOLIDWORKS  
**Software Libraries and Tools:** ROS/ROS2, quadprog, qpOASES, OpenCV, Git, LaTeX, Docker

## LANGUAGES

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**Korean** (native)  
**Chinese** (bilingual)  
**English** (fluent)

## OTHERS

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**Military Services** | Korea Army, Republic of Korea  
• Honorably Discharged.

**Mar. 2015 - Dec. 2016**